


Favorable action on this application is respectfully requested.

Respectfully submitted,

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The depositing of metal 14 on native oxide layer 12 by means of the low temperature arc vapor deposition process 20 converts the electrically insulating native oxide layer 12 to a mixed layer 30 on substrate 10 as shown in Fig. 3 which mixed layer 30 has a degree of electrical conductivity sufficient to make substrate 10 useable as an electrode in a device such as a capacitor or battery. In other words, native oxide layer 12 has been converted from being essentially non-conductive, i.e. insulating, to having an increased and improved degree of electrical conductivity. Thus, the quality of the treated surface of substrate 10 is improved in that the surface layer 12 is changed from an insulating, semiconducting or dielectric state to an electrically conducting state.

The substrate shown in Fig. 3, treated by the method of the present invention, is ready for further processing in the manufacture of an electrode for use in capacitors, batteries and the like. Typically, in the case of a capacitor, an appropriate electrode material 40 as shown in Fig. 4 is deposited on the substrate treated surface by techniques well-known to those skilled in the art. Examples of electrode material 40 are redox pseudo capacitance materials such as, but not limited to, oxides and mixed oxides of ruthenium, iridium, manganese, nickel, cobalt, tungsten, niobium, iron, molybdenum, or under potential deposition systems such as palladium, platinum, lead dioxide or electro-active conducting polymers such as polyaniline, polypyrrole, and polythiophene.

The present invention is illustrated further by the following example.

#### Example

The Claims

6. A substrate of improved electrical conductivity wherein said substrate is selected from the group consisting of Group IVA, Group VA and Group VIA metals, aluminum, manganese, nickel, copper and stainless steel and said substrate having a native oxide layer on a surface thereof, and wherein said substrate surface has deposited thereon by low temperature arc vapor deposition metal selected from the group consisting of Group IA and Group VIIIA metals for increasing the electrical conductivity of said native oxide layer.

7. A substrate according to claim 6 further including a coating on said native substrate surface of material rendering said substrate useable as an electrode in a capacitor.